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NCIC HPV
Sent by: Mary-Beth Weaver

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To: NCIC HPV, moran.matthew@epa.gov
cc:
cc:
Subject: Environmental Defense comments on the Lubricating Oil Basestocks Category

Richard_Denison@environmentaldefense.org on 08/04/2003 11:05:37 AM

To: oppt.ncic@epamail.epa.gov, hpv.chemrtk@epamail.epa.gov, Rtk Chem/DC/USEPA/US@EPA, Karen Boswell/DC/USEPA/US@EPA, Gravt@api.org
cc: MTC@mchsi.com, kflorini@environmentaldefense.org, rdenison@environmentaldefense.org

Subject: Environmental Defense comments on the Lubricating Oil Basestocks Category

(Submitted via Internet 8/4/03 to oppt.ncic@epa.gov, hpv.chemrtk@epa.gov, boswell.karen@epa.gov, chem.rtk@epa.gov, MTC@mchsi.com, and Gravt@api.org)

Environmental Defense appreciates this opportunity to submit comments on the Robust Summary/Test Plan for the Lubricating Oil Basestocks Category.

The Petroleum HPV Testing Group of the American Petroleum Institute proposes that the petroleum refinery streams known as lubricating base oils be considered together as a category for purposes of the U.S. High Production Volume Chemical Challenge Program. In support of this proposal the sponsor has submitted a comprehensive Robust Summary/Test Plan. The Test Plan describes in some detail how these petroleum refinery streams are produced and used, their chemical/physical properties and available information on their environmental and mammalian toxicities. The Robust Summary provides additional detail describing the available studies. Both the Test Plan and the Robust Summary are well written, well organized and extensively referenced. Both also make it obvious that these refinery streams are very complex mixtures of chemicals with high boiling points, and that they appear to have relatively low chemical and biological reactivity.

Due to the nature of their use by the public and in some industrial applications, a significant portion of lubricant oils is eventually released into the environment; therefore, knowledge of the fate and toxicity of these chemicals is of particular importance. Review of data described in this Robust Summary/Test Plan indicates that the petroleum streams in this proposed category consist primarily of large molecules that are virtually insoluble in water, are stable in air and are slowly degraded in the environment by microorganisms. Further, available data suggest that most of these petroleum streams have low acute environmental and mammalian toxicity. This latter finding is probably due to the fact that these molecules are sufficiently large to prevent their passage across biological membranes, thus limiting or preventing systemic effects.

Our primary concern regarding the human/mammalian toxicity of these petroleum streams arises from the fact that some of the less refined streams may contain impurities that are known or suspected to be mutagenic and possibly carcinogenic. This concern does not apply to those streams that are highly refined to eliminate these unwanted impurities and hence appear to possess little or no mammalian toxicity.

The chemical complexity of the proposed lubricating oil basestocks category is illustrated by the fact that these petroleum streams are not defined by their actual chemical constituents, but by their process histories. This

proposed category is divided into two subcategories, "Distillate Base Oils" and "Residual Base Oils". Distillate Base Oils may be further grouped by degree of processing, levels of unwanted constituents and expected mutagenic and carcinogenic potential, into "Unrefined and Mildly Refined Distillate Base Oils" and "Highly and Severely Refined Distillate Base Oils". The complexity of these fractions is vividly illustrated in Appendix A, which lists dozens of CAS numbers for the sub-fractions of these petroleum streams, each of which represent complex mixtures of chemicals. This complexity is further compounded by the presence of numerous unwanted impurities in some of the less refined streams.

Given the complexity of the different streams and the fact that different fractions of these petroleum streams may have significantly different uses and toxicities, our major question regarding this submission is: "Is this proposed category too large and complex for appropriate analysis?" We suggest that it is too large and should be subdivided. In suggesting that this proposed category is too large we do not mean to imply that the Robust Summary/Test Plan do not address the required SIDS elements to the extent possible. However, review of this information makes it clear that the degree of refinement of these petroleum streams introduces significant differences in the compositions, uses and toxicological properties of the resulting products.

Extreme examples of this variability are seen in a comparison of the white oils and some of the residual oils. The white oils, which are considered very severely refined distillate base oils, appear to have been adequately studied and demonstrated to have little or no biological activity; many are actually approved for use in food. On the other hand, some of the residual oils have higher molecular weights and may contain numerous impurities, including substantial quantities of polyaromatic hydrocarbons. Thus, some of these oils are mutagenic and are expected to have carcinogenic activity, although most have been subjected to relatively little study.

Therefore, we would suggest that this proposed category be divided into several categories. Perhaps the most appropriate division of this proposed category is that shown in Table 3, "Matrix of Available Data and Proposed Testing" presented on page 23 of the Test Plan: Unrefined and Mildly Refined Distillate Base Oils, Highly and Severely Refined Distillate Base Oils, and Residual Oils. In suggesting that the present submission be subdivided we are not suggesting a great deal of additional work. Most of the necessary studies have been done and adequately described in the present submission and most of the necessary information to support more than one category could be derived from material presented in the present submission. And the additional testing proposed appears to be largely consistent with such a division of this proposed category into the three categories we suggest.

Other Comments:

1. The Testing Group is proposing to perform a reproductive/developmental screening study (OECD 421) only on a representative sample of a highly to severely refined distillate base oil. We feel it would prove more informative if this effort were also directed to a study of a less refined stream, thereby providing comparative studies of a highly refined stream and less refined stream.
2. The matrix of available and proposed studies on page 23 of the Test Plan indicates reproductive/developmental studies are not available for the Unrefined and Mildly Refined Oils, but will not be conducted because this fraction is considered similar to the heavy vacuum gas oils, for which such studies are available. Little information other than an assertion that the two streams are similar in degree of refining and composition is provided as the basis for this, however. (If the Unrefined and Mildly Refined Oils are more similar to the heavy vacuum gas oils, then perhaps these two

petroleum streams should be grouped in a separate category.) Regardless, given the extent of reliance of the overall category rationale and the associated hypothesis as to the role of degree of refinement on toxicological properties, we believe strongly that the sponsor should directly test a representative sample of unrefined and mildly refined oils.
3. We feel it would be appropriate to incorporate the proposed Repeat-dose study of the Residual Base Oils into the proposed Repro/Developmental study of this petroleum stream via a combined testing protocol.
4. A minor comment: Footnote 3 in Table 3, Matrix of Available Data etc. should say "read across from Highly and Severely Refined Oils".
5. The last 160 pages of the Robust Summary appear to be redundant and unnecessary.

Thank you for this opportunity to comment.

Hazel B. Matthews, Ph.D.
Consulting Toxicologist, Environmental Defense

Richard Denison, Ph.D.
Senior Scientist, Environmental Defense